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ABSTRACT

Based on a population of 2,031 second and fifth grade students, ten classroom situations were studied for their relative effects on reading achievement. The relative merits of criterion versus norm-referenced tests also were examined. Data came from teacher questionnaires and student scores on multiple choice cloze tests (the criterion-referenced tests) and various norm-referenced tests. Specific conclusions were as follows: (1) One-to-one instruction by the teacher had a weak positive effect on student achievement, and was not considered cost-effective. (2) Specialist instruction, appropriately allocated to low ability students in both grades, seemed to have less effect on student reading achievement than would be expected from the amount of time allocated, especially in the second grade. (3) Although instruction from aides outside the classroom seemed to be in reasonable amounts for low ability students in both grades, the analyses did not indicate that this aide time was effective in increasing reading achievement. (4) In general, instruction carried on in large groups or entire classes was not overly effective. (5) Small group instruction by the teacher was more effective than other types of instruction, while the relatively large amounts of time devoted to independent small group work proved less favorable in promoting student achievement. (6) The findings regarding criterion versus norm-referenced tests were not clear. (RL)

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Productivity of Instructional Time and Resources in School Reading Programs

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Introduction

This report summarizes the findings of a large-scale study of educational productivity in school reading programs. A detailed theoretical framework for this investigation is provided by Kidder, Schuder, and O'Reilly (1977); Kidder, O'Reilly, and Kiesling (1975); Kiesling (1977-78); and Streeter and Kidder (1977). The approach incorporates basic and applied concerns surrounding the effects of instructional time and school resources on student achievement. Related concerns have been expressed in Carroll's (1963) model of school learning, Bloom's (1968) concept of mastery learning, and Wiley and Harnischfeger's (1974) time-and-learning models. The works of economists (Garner, 1978; Rossmiller and Gaske, 1977; Kiesling, 1977-78) and educators (Roecks, 1978a; Roecks, 1978b; Walberg, undated) also reflect an interest in educational productivity, with the recent work by Walberg (undated) especially provocative in its proposal of a psychological theory of educational productivity.

Educational productivity is traditionally estimated by a production function, an uncomplicated expression of input-output relationships that simplifies the predictive relationship between production factors (e.g., student aptitude, quality and quantity of instruction) and school output (i.e., student achievement). The productivity approach provides answers to traditional questions of educational effects, such as the following: Does small group instruction always have a strong positive effect on student achievement, especially when other causal factors are controlled?

In the present research, the major areas of inquiry are:

1. The differential effects of educational production factors

(amounts of time spent in various instructional modalities) assessed with regard to predicting the reading achievement of students of varying ability and grade level.

2. The contrasting abilities of criterion-referenced and norm-referenced measures to reflect the differential effectiveness of educational production factors.

The production factors or time variables used in the study (Table 1) are subsumed in some of the educational production factors proposed by Walberg (undated). The criterion-referenced outcome measures are Multiple-Choice Cloze (MCC) Achievement Monitors derived from the Test Development Notebook (New York State Education Department, 1977). Correlational and multiple-regression techniques were used to estimate the instructional effects of the production variables. The major purpose of the study was to clarify the impact of reading program resources on student achievement.

Sample

The study was conducted during the initial year of a research and development effort to create a packaged system for local analysis of reading programs. This effort, called the PAR (Program Analysis in Reading) Project, involved the participation of 2,355 students in grades 2 and 5 from 17 volunteer schools in 7 districts. The total study population was 2,031 grade 2 and 5 students, representing a loss of 324 students due to absence, mobility, and incomplete data. The study participants are profiled in Table 2.

District A is a middle-class suburban district. Districts B, C, and D are small rural districts with mostly middle-class families. Districts E, F, and G are small or medium-size urban districts. Second and fifth grade classes were chosen for the study because the effects of the instruc-

Table 1

Production Time Variables*

Code	Variable
1-1	One-to-One Instruction from Teacher
SIS	Supplemental Instruction from Specialist, Outside the Classroom
SIA	Supplemental Instruction from Aide, Outside the Classroom
WCD	Whole Class: Direct Instruction from Teacher
WCI	Whole Class: Independent Student Work
WCG	Whole Class: Group Work without Teacher
SGD	Small Group: Direct Instruction from Teacher
SGO	Small Group: Direct Instruction from Other
SGI	Small Group: Students Working by Themselves without Teacher
SGG	Small Group: Students Working Together without Teacher

*Time variables measured in average minutes per typical week of instruction.

Table 2

Profile of Study Participants

	District							
	A	B	C	D	E	F	G	Total
Students	464	54	148	92	448	404	421	2031
Teachers	19	3	8	4	22	17	26	99
Schools	3	1	2	1	4	3	3	17
District Type[a]	S	R	R	R	U	U	U	

[a]S--Suburban; R--Rural; U--Urban (Small to Medium Size).

tional time variables on student performance were expected to be pronounced in these grades ( ). Final analyses were based on low and high ability subsamples within grades 2 and 5. Although the analysis was based on a strictly volunteer sample, the school profile is suggestive of the potential generalizability of research findings.

Instrumentation

The outcome measures of reading comprehension were the Multiple-Choice Cloze (MCC) Achievement Monitors developed by the Bureau of School and Cultural Research and, where scores were available, the standardized norm-referenced tests used in the participating schools.

The MCC Achievement Monitors, the criterion-referenced measures used in the study, comprised Multiple-Choice Cloze Exercises drawn from the Test Development Notebook. MCC exercises are designed to measure literal--as opposed to inferential or interpretive--comprehension. As measures of literal comprehension, MCC exercises are criterion-referenced measures. That is, they assess student performance on a fundamental objective of reading instruction: literal comprehension.

An MCC exercise consists of a coherent passage,[a] 49 to 80 words in length, in which approximately every fifth word (nouns, verbs, adjectives, and adverbs) has been deleted.[b] The deleted words are placed in response arrays (with distractors controlled for grade level) to constitute multiple-choice items. The reader's task is to select the deleted word from the response array. Since the distractors are grammatically plausible but semantically implausible, the ability to literally comprehend the passage

[a] Passages for the MCC exercises used in the achievement monitors for this study were taken from reading texts, grades 1 through 12.

[b] Passages taken from grade 1 and 2 texts were of shorter length, had fewer deletions, and involved deletions only of nouns and verbs.

is sufficient for selection of the correct word. Schuder, Kidder, and O'Reilly (1976) and O'Reilly and Streeter (1977) describe the MCC Exercises in detail, including discussions of their validity and reliability.

MCC exercises are assigned to difficulty levels based on the use of Spache and Dale-Chall readability formulas (Appendix A). This feature of the MCC exercises permits the construction of parallel test forms. That is, multiple test forms can be constructed using MCC exercises at the same difficulty levels and spanning the same range of difficulty. For the study, two parallel MCC Screening Tests and 24 MCC Achievement Monitors were constructed. The 24 monitors consisted of four parallel forms at each of six overlapping monitor levels (Appendix B), and the range of difficulty levels across the six monitor levels was 1 to 26.

The construction of four parallel forms per monitor level permitted students to receive four achievement monitors during the school year without repeating test forms; the overlapping monitor levels allowed students to receive test forms increasingly more appropriate to their level of achievement in literal comprehension. For example, if a student did very well on a monitor level 3 test form, on the next test administration he would receive a monitor level 4 test form. If he performed poorly, he would be given an achievement monitor at a lower level on the subsequent test administration. (An MCC Achievement Monitor may be found in Appendix C.)

Performance on the MCC Achievement Monitors is expressed in terms of a monitor score, a conservative indicator of the difficulty or complexity of the prose a student is able to literally comprehend. A monitor score is a difficulty level from 1 to 26 and is based on a student's pattern of performance on the achievement monitor passages; it is not based on a raw score or on total items correct.

Three rules govern the determination of monitor scores:

1. If a student performs consistently, passing each successive passage on his achievement monitor until the passages become too difficult for him, his monitor score will be the difficulty level of the last passage passed. (Passing scores for the passages are 80% for those with 5 or 10 items and 67% for those with three items.)
2. If a student fluctuates, passing some passages and failing others, his monitor score will be the difficulty level of the second most difficult passage passed.
3. If a student passes only one passage or fails all of the passages, his monitor score will be the difficulty level of the first (easiest) passage.

These rules assure a conservative estimate of a student's literal comprehension ability.

The standardized norm-referenced reading tests used in the participating schools include the Metropolitan Achievement Test, the Iowa Test of Basic Skills, the Comprehensive Test of Basic Skills, and the Stanford Achievement Test. Grade 5 scores were converted to a common scale using Anchor Study Conversion Tables (Loret, Seder, Bianchini, & Vale, 1974).

Data on reading program characteristics were gathered with a Teacher Questionnaire completed by each teacher (Appendix D). The questionnaire elicited detailed information on a number of reading program variables. All the information on the production time factors (Table 1) used in the study was collected by means of the Teacher Questionnaire, including the number of minutes per week spent in the time variable categories.

For the sake of gaining a measure of statistical control in the study,

teachers were given a list of their students and asked to estimate each student's reading ability in comparison with that of other students at the same grade level. The teachers were to use three categories for classifying their students: high reading ability, average reading ability, and low reading ability.

Data Collection and Handling

Data used in the study were collected during the 1977-78 school year. In September, the two parallel MCC screening tests were administered to the grade 2 and 5 students in the 17 volunteer schools. Screening test performance determined student placement in monitor levels, with the difficulty level of the last (hardest) passage passed on the screening test determining the student's monitor level for the first achievement monitor. The determination of monitor level placement is illustrated in Table 2.

Table 2

Monitor Level Assignment Based on Last Screening Test Passage Passed

Difficulty level of last screening test passage passed	1	3	6/7	9	12	15	18
Monitor level assignment[c]	1	1	2	3	4	5	5

MCC Achievement Monitors were administered four times during the year, according to the following schedule:

MCC Achievement Monitor Administration	Date(s)
1	November 1-2, 1977
2	January 10-11, 1978
3	March 21-22, 1978
4	May 31-June 1, 1978

[c]For the first MCC Achievement Monitor administration, only 20 test forms spanning 5 monitor levels and 22 difficulty levels were used; for all subsequent administrations, 24 forms spanning 6 monitor levels and 26 difficulty levels were used.

The four test administrations were a basic feature of the PAR Project, the context of the present study, but were not essential to the data collection effort. Student performances on the first and fourth test administrations constituted the pre- and posttest CRT data, respectively.

Teachers completed the Teacher Questionnaire during a six-week span from late January to early March, 1978. (Completion of the questionnaire required up to 2 hours of teacher time.) In an attempt to control for collaboration in responding to the questionnaire, school principals were asked to encourage teachers not to confer during completion of the questionnaire. In March of 1978 the teachers were asked to estimate the reading ability of their students. The standardized norm-referenced reading test administrations occurred in May of 1978.

For the MCC tests, second-grade students recorded their responses directly on their test booklets. Their scores were subsequently transferred to NCS optical scanning forms. All fifth grade students responded directly on NCS optical scanning forms. A special NCS scanner program containing answer keys to the 24 MCC test forms was used to score the answer sheets. The program produced a computer tape with passage and total test raw scores. Another computer program used the passage scores on the computer tape to generate monitor scores for each student on each test administration.

The data from the Teacher Questionnaires and the teachers' classification of their students in terms of high, average, and low reading ability were hand-coded, keypunched, and merged with the computer-generated monitor score data. While the teacher questionnaire data were being coded, it became clear that there were two distinct types of instructional setting, the "traditional" classroom and the "individualized" classroom. The traditional classroom, the most common, had some whole class instruction but principally

emphasized direct teacher instruction to small, stable groups of students. In contrast, the individualized classroom had frequent direct teacher instruction to individuals and to small groups with these groups changing often, depending on the particular skills being taught. In one medium-size urban district with an emphasis on individualization, all of the reading classes were homogeneously grouped by student ability. Homogeneous classes seldom occurred in the traditional classroom. However, the number of students in "individualized" settings was too small for analysis. Therefore, only the "traditional classroom" data sample was analyzed.

The data on student reading achievement on the standardized tests varied by district and thus required some special handling. Each school provided individual student scores on the particular test it used. Because the primary data analysis was by ability group within grade across districts, the NRT scores, in percentile rank form, were converted to the same raw score scale using the Anchor Study Conversion Tables noted above. This conversion provided a data base at grade 5 that allowed analyses of comparable production time-variable models for the criterion-referenced MCC test and the norm-referenced standardized tests.

Data checks and edits were completed to assure consistency in individual student records. A "traditional classroom" subsample was created from the total data base and served as the primary source of data for the analyses. This modified data base was subsequently stratified according to: (1) low ability, grade 2 students; (2) high ability, grade 2 students; (3) low ability, grade 5 students; (4) high ability, grade 5 students. Direct comparisons involving the CRT and NRT outcome measures across stratification components were conducted only for grade 5 students due to the lack of metric conversion tables at the grade 2 level.

Analyses

The model used to define the relation between student performance in reading and the production factors is the general linear regression model. The model assumes the form $y=XB+\epsilon$, where $E(\epsilon)=0$, $E(\epsilon\epsilon')=\sigma^2 I$, and X is a known design matrix the columns of which include the student pretest measure and a full quadratic set of the instructional time variables.

Tables 3-7 present means, standard deviations, and zero-order correlations for all variables for high and low ability groups in grades 2 and 5.

To mitigate the problems of parameter estimation inherent in the correlational structure of a quadratic set of measurements, the production factors were transformed into first- and second-order orthogonal polynomial functions (see Forsythe, 1957). This order of polynomial was decided upon a priori and is consistent with the likelihood of occurrence of nonlinear relationships between amounts of instructional time and student reading performance (N.B. y remains linear in the parameters). It may be the case that time spent in particular instructional settings only starts to reflect a positive effect on student reading achievement after some threshold level is attained or perhaps it is initially more productive and thereafter its effectiveness begins to diminish.

Variable selection procedures were used to manifest sample space resolutions of the instructional time functions in predicting student reading performance. The intent throughout was essentially to eliminate from the full set of production functions those functions having minimal effect in predicting student performance in several stratification levels (i.e., ability groups within grade). The C_p criterion (Mallows, 1964, 1966, 1973) served as the formal variable selection procedure.

The regressions of the criterion-referenced and norm-referenced mea-

sures of the final isolated variable subsets resulting from the C_p procedure are shown for each stratification level in Tables 8-10. The instructional time effects in these regression analyses are somewhat complex but can be interpreted on the basis of the magnitude and directionality of the resulting standardized regression weights. Figure 1 (from Kiesling loc. cit.) depicts the interpretations possible in assessing the effects of the time variables in predicting student performance. All regressions were carefully analyzed for adherence to linear model assumptions. We note that the stratification dimension defined by the grade 2 low ability students required special technical treatment. A mapping of standardized residuals and the pretest variate for this subset model showed the residuals forming distinct clusters. When a linear covariate identifying cluster membership was added to this subset model, the amount of variation in student performance was almost completely accounted for by this augmented model. This result suggested that a major portion of variation would be explained by one or two principal components of the data. However, only 35 percent of the total variance of the independent variables was accounted for by the first two principal components. It is quite likely that the cause of the problem is related to the quite arbitrary classifications by teachers of students into ability groupings. As a final course of action, the criterion-referenced measure was regressed on the production functions comprising this subset model in each group of students defined by the clustering phenomenon. The results of this analysis showed no difference in the regressions between clusters ($p < .05$).

The pretest effect is noteworthy in terms of variation in student performance accounted for in each subset model. This pretest effect is especially prevalent in the grade 5 high ability groupings. For these

stratified subset models, the improvement in prediction of student performance while controlling for the influence of the pretest measure approximates the $p<.05$ significance level. It is felt this provides adequate evidence to clarify the effect of instructional resources on these high ability students, given the observed sample sizes and the exploratory nature of the study.

Results

Pretest Control

As noted above, the CRT pretest was used to control the entering ability of the students in each analysis. As expected, in all analyses the pretest effect was large, especially so in the grade 5 ability groups.

Instructional Time Effects

For clarity of reporting, major findings are summarized in sequence for each instructional variable of interest. As noted above, quadratic functions of instructional time were used to specify the relationship between individual production factors and outcomes, that is, student achievement. Graphs were used to display significant time-performance relationships.

One-to-one Instruction by Teacher (1-1)

In grades 2 and 5, teachers spent more time in One-to-One Instruction with low ability students than with high ability students (Table 3). Among high ability students, however, those in grade 5 received more One-to-One Instruction than those in grade 2.

In grade 2, One-to-One Instruction is positively correlated with Supplemental Instruction from Specialist Outside Classroom for the low ability students (Table 4).

In grade 5, One-to-One Instruction is positively related to two variables for high ability students; these variables are (1) Small Group: Students Working by Themselves without Teacher, and (2) Small Group: Students Working Together without Teacher (Table 7).

Tables 8 and 9 contain regression analysis data using the criterion-referenced measure as the dependent variable. In grade 2, for high ability students, the quadratic component of One-to-One Instruction is statistically important. Thus, with reference to Figure 1, this variable can be inter-

preted--with caution, due to the low R^2--as having a positive increasing effect on final student performance in reading.

The effect of One-to-One Instruction as an important predictor of performance is absent in all other models, including the norm-referenced models.

Supplemental Instruction from Specialist Outside Classroom (SIS)

It is very clear in Table 3 that a considerable amount of weekly time is spent in supplemental help by a specialist for lower ability students in both grades 2 and 5. This variable is not highly correlated (Tables 4-7) with the other time variables being investigated, and its relationship to student achievement is negative. While specialist instruction outside the classroom seems to predict performance for grade 5 low ability students on the criterion-referenced measure (Table 9), its effect on performance is negative. Evidence of significant negative relationships between specialist instruction and student performance was also noted by Kiesling (1978).

Supplemental Instruction from Aide Outside Classroom (SIA)

The amount of time spent on supplemental instruction by aides is less than the amount of time delivered by specialists but greater than One-to-One Instruction from the teacher (Table 3).

As shown in Table 9, the effect of aide time on student performance is negative for low ability fifth graders. This finding is consistent for both the criterion-referenced and norm-referenced achievement tests.

Whole Class: Direct Instruction from Teacher (WCD)

Less time is spent in whole class instruction than in small group instruction. By definition, whole class time should be similar for both low and high ability groups. However, the amount of time reported for whole class direct instruction in the grade 5 low and high ability groups is counter-intuitive.

With reference to Table 4, in grade 2 for low ability students, whole

class instruction by the teacher is positively related to (1) Whole Class: Independent Student Work (WCI) and (2) Small Group: Students Working Together without Teacher (SGG). Table 5 for high ability students in grade 2 indicates that whole class instruction is positively related to (1) Whole Class: Independent Student Work (WCI) and (2) Supplemental Instruction from Aide, Outside the Classroom (SIA). In grade 5, negative relationships arise in both the low and high ability groups. For the high ability students (Table 7), whole class instruction is negatively related to Whole Class: Independent Student Work (WCI), whereas both ability levels (Tables 6 and 7) show definite inverse relationships with many of the Small Group instructional modes.

The achievement effects of whole class instruction by the teacher are relatively strong, but they vary somewhat and are difficult to interpret. In Table 8 (and see Figure 2), the criterion-referenced data for low ability students in grade 2, there is a clear negative effect as more whole class time is provided. This same negative relationship was observed in the grade 5, high ability model (Table 9). However, for the low ability grade 5 students, whole class instruction from the teacher has a positive effect on the criterion-referenced measure (Table 9 and Figure 5). Finally, this time variable did not predict in the norm-referenced models.

Whole Class: Independent Student Work (WCI)

Relatively speaking, little time is spent in whole class independent student work in grades 2 and 5 (Table 3).

Whole class independent student work is moderately related to many instructional variables across all sample stratifications (Tables 4-7).

In grade 2 for high ability students there is reasonable evidence that WCI is negatively related to performance at first, reaches a minimum, and then becomes positive with more whole class independent student work time (Table 8 and

Figure 4). The time-performance relationship in Figure 4 suggests that on the average, to be effective, more than 60 minutes of instructional time per week would have to be allotted to whole class independent work activities for these students.

The effect of whole class independent student work time on performance was consistent for grade 5 high ability students in the criterion-referenced and norm-referenced samples. These models provide evidence that WCI has an increasingly negative effect on student achievement (Tables 9 and 10).

Whole Class: Group Work without Teacher (WCG)

The amount of instructional time, on the average, for whole class group work without a teacher is very low in all ability groups (Table 3).

For grade 2 students, this variable is not correlated with the other production factors. However, for grade 5 students, WCG showed dependencies, mostly of an inverse nature, with several time functions (Tables 6 and 7).

Time spent in whole class instruction without a teacher was observed as influencing performance in the criterion-referenced, low ability student sample in both grade levels (See Tables 8 and 9 and Figure 1). It is quite clear that this production factor is negatively related to student achievement.

Small Group: Direct Instruction from Teacher (SGD)

In general, most instructional time is spent in direct teacher instruction to small groups, or small groups of students work independently (Table 3).

In grade 2, the only unusual relationship is the negative correlation between SGD and 1-1 for low ability students (Table 4). For grade 5 students, the correlations are reasonably consistent across ability levels (Tables 6 and 7).

For the criterion-referenced data, in the grade 2 low ability sample (Table 8) the SGD effect on student achievement is relatively strong; at first

positively related to performance, it reaches a maximum and then becomes negative as small group instruction by the teacher increases. The SGD time-performance relationship in Figure 3 suggests the need for a ceiling of approximately 3 to 4 hours of instructional time per week for Small Group: Direct Instruction from the Teacher.

The effect of SGD on student performance for the high ability second and fifth graders for both the criterion-referenced data and norm-referenced data is consistent, with increases in SGD resulting in gains in student achievement (Tables 8, 9 and 10). For the grade 5, high ability, criterion-referenced sample, there is a slight lag-time effect in that more than 1½ hours of small group instructional time by the teachers, on the average, would be required to manifest the performance gain (Figure 7).

Unexpected results were obtained on SGD for grade 5 low ability students in the norm-referenced test sample. The effect of SGD on student achievement in this stratification is negative (Table 10).

Small Group: Direct Instruction from Other (SGO)

The time associated with this production factor is considerably lower than time allocated to other instructional modes (Table 3). SGO typically meant that another teacher or an aide was working with a small group in the classroom.

With regard to correlational data, the degree and the nature of dependencies for SGO were very moderate and quite varied across all stratification levels (Tables 4 through 7).

The effects of this instructional variable on student performance are clearly interpretable in several of the stratified samples. For the low ability students in grade 2, SGO effect is of small magnitude and positively related to student performance (Table 8). For the grade 5 high ability stu-

dents in the criterion-referenced sample, there is a positive effect on performance as additional small group time is provided (Table 9). A comparable positive effect on achievement is observed in the grade 5, low ability, norm-referenced model (Table 10 and Figure 6). These results suggest uniformity of the SGO effect across several controlled stratifications.

Small Group: Students Working by Themselves without Teacher (SGI)

This variable, SGI, accounts for the bulk of classroom reading instruction in both the second and fifth grades. Hundreds of minutes per week are spent in this instructional setting. However, the analyses of SGI suggest that it does not affect performance in a manner similar to the other production factors dealing with small group instructional time.

The correlation data contained in Tables 4 through 7 indicate SGI is related to several time variables; however, for the most part, the degree and direction of these dependencies are consistent with normal expectations for the effects of small group instructional time.

Because of the relatively large amount of instructional time devoted to independent small group instruction, clearly interpretable relationships with student reading achievement were anticipated. With reference to Table 8, SGI has a small linear relationship with performance for low ability second graders. That is, the more time students spend on their own in small groups, the less positive effect on student performance. This is a very important finding since SGI is a very large time variable, second only in magnitude to SGD (Table 3). Even more time is devoted to SGI in the high ability second grade sample than in the low ability sample, and yet SGI is not observed as an important predictor of student performance (Table 8).

Similar results were obtained for each of the grade 5 student subset models (Tables 9 and 10), the sole exception being the low ability, criterion-

referenced sample. In this latter stratification, none of the instructional variables involving a small group setting was observed as a key predictor of performance. Even though in grade 5 a great deal of time is spent on independent student work, it has a negative relationship with student achievement.

Small Group: Students Working Together without Teacher (SGG)

On the average, approximately 15 minutes and 10 minutes a day were allocated to grade 2 and grade 5 students working rogether without a teacher, respectively (Table 3).

The only subset model in which time spent in this instructional mode showed a relationship with achievement is the grade 5, low ability, norm-referenced sample. For this model, the SGG effect on student performance is positive, becoming increasingly positive.

Conclusions and Recommendations

The utility of analyzing reading program effectiveness using allocated instructional time is based on the following assumptions:

- Allocated instructional time is related to time-on-task, a predictor of student achievement, and
- Instructional time is usually teacher time, the major component of instructional costs.

If teachers are allocating time to non-productive instructional settings or configurations, they could be wasting money. If instructional time in particular configurations (e.g., students working alone) is less productive than in other configurations, then the emphasis should shift to a more productive mode. This study addressed the productivity of commonly used instructional settings in reading. Conclusions and recommendations focus directly on the differential effectiveness of these instructional settings. Within reason, findings of this investigation support the conclusion that the differ-

ential effectiveness of instructional time variables can be obtained by analysis using a basic productivity model.

Although relatively little time was spent in one-to-one direct instruction by the teacher, it still had a weak positive effect on student achievement, when observed. More one-to-one instruction by the teacher probably would be effective in increasing student reading achievement. However, it is common knowledge that direct one-to-one instruction by a teacher is very costly and, hence, unlikely to be cost-effective.

Specialist instruction outside the classroom was appropriately allocated to low ability students in both grades. However, for the amount of time allocated to this mode of instruction, especially in grade 2, its effect on student achievement seems less than one would expect from direct specialist help. But the specialist is usually working with very low performing students, so dramatic increases in student achievement are perhaps out of the question. Nevertheless, specialist time is expensive and even more so if it is one-to-one instruction and not instruction to small groups of students. Thus, if specialist help is to be used, it should be used with reason and monitored carefully for effectiveness.

As with specialist instruction, low ability students in grades 2 and 5 receive reasonable amounts of instruction from aides outside the classroom. However, the analyses do not support the conclusion that out-of-classroom aide time is effective in increasing reading achievement. If aides are used extensively for reading instruction and students are not receiving a quality reading program during regular classroom instruction, obvious improvements in reading achievement are not likely. Reallocating available funds, perhaps even hiring an additional qualified teacher and reducing class size, might be considered.

Time allocated to whole class direct teacher instruction is relatively small in grade 5. However, over 50 percent more time is allocated to whole class direct instruction from the teacher in grade 2 than in grade 5, an unexpected and perhaps undesirable situation. In general, instruction carried on in large groups or entire classes was not overly effective. Therefore, it is suggested that the use of whole class reading instruction be moderate and that the amount of whole class direct teacher instruction in the lower grades be converted to direct teacher instruction to small reading groups.

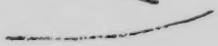
The greatest amounts of instructional time were allocated to small group instruction, a very logical use of time. Direct instruction by the teacher to small groups was quite effective when compared to other instruction. In contrast, the relatively large amounts of time devoted to independent small group work proved less favorable in promoting student achievement. Practitioners should be cautioned about these findings because, on the average, as much time is spent in independent work as is spent in direct teacher instruction to small groups. It seems reasonable to recommend, based on the findings, that as much time as possible be spent on direct teacher instruction to small reading groups (not more than eight students, preferably) and that relatively less time be spent in settings that allow students, especially younger ones, to "work" on their own. The suggested approach will probably be most productive and cost-effective, especially at the elementary level.

The findings regarding the relative sensitivity of the criterion-referenced test versus the norm-referenced tests were not clear. A more sensitive dependent measure will allow production factors to account for more variance. Under all conditions, the amount of achievement variance accounted for using the criterion-referenced measure was greater than the norm-referenced measure. However, the differences were not great. Neverthe-

less, due to the general tendency of criterion-referenced tests to reduce variability in achievement and not maximize it as norm-referenced tests do, the use of the criterion-referenced tests in an educational productivity study is probably as defensible as the use of norm-referenced tests.

Figure 1

Curvilinear Forms Defining Relationships Between Instructional Time Variables and Student Performance

Linear Term Weight	Quadratic Term Weight	Function	Illustration
positive	positive	positive increasing	
positive	negative	positive at first, reaching a maximum, and then decreasing	
negative	negative	negative, becoming increasingly negative	
negative	positive	negative at first, reaching a minimum, and then increasing	
positive	not significant	positive linear	
negative	not significant	negative linear	
not significant	positive	positive increasing	
not significant	negative	negative, becoming increasingly negative	

BEST AVAILABLE COPY

Figure 2

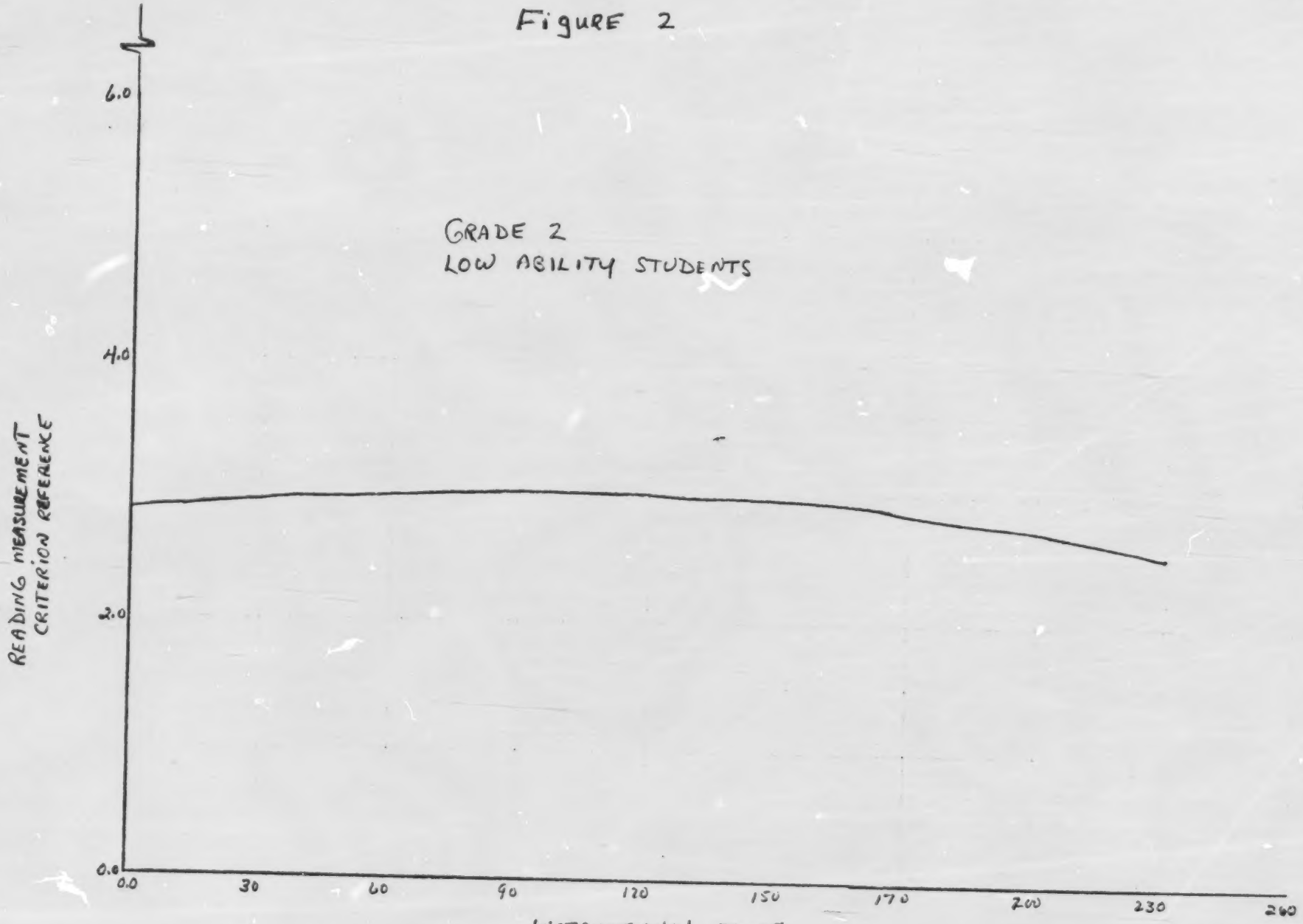
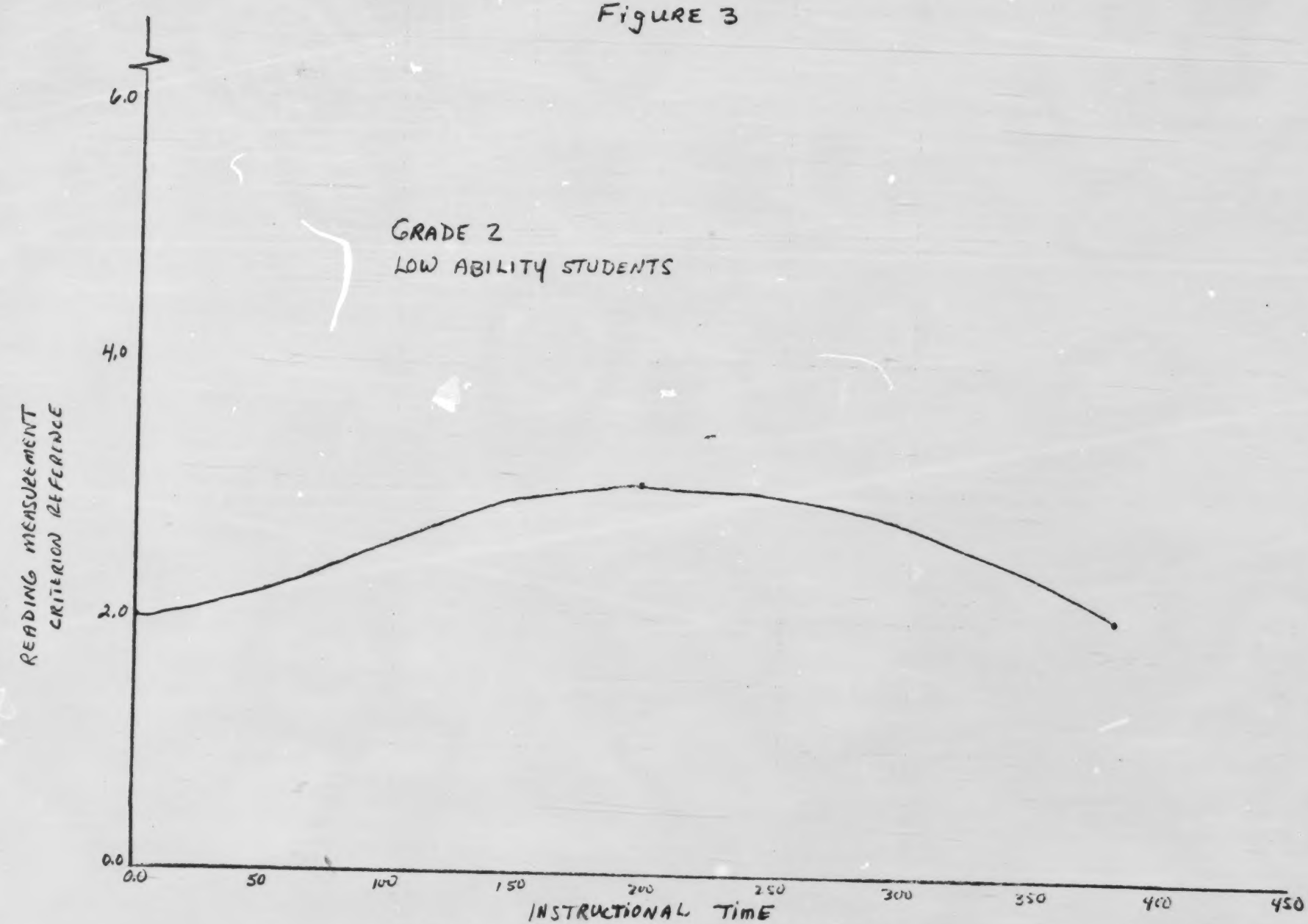

GRADE 2
LOW ABILITY STUDENTS
READING MEASUREMENT
CRITERION REFERENCE
6.0
4.0
2.0
0.0
0.0
30
60
90
120
150
170
200
230
260
INSTRUCTIONAL TIME
Whole Class Direct Instruction From Teacher
(AVERAGE MINUTES PER WEEK)

Figure 3


GRADE 2
LOW ABILITY STUDENTS
READING MEASUREMENT
CRITERION REFERENCE
6.0
4.0
2.0
0.0
0.0
50
100
150
200
250
300
350
400
450
INSTRUCTIONAL TIME
SMALL GROUP DIRECT INSTRUCTION FROM TEACHER
(AVERAGE MINUTES PER WEEK)

-26-

FIGURE 4

GRADE 2
HIGH ABILITY STUDENTS

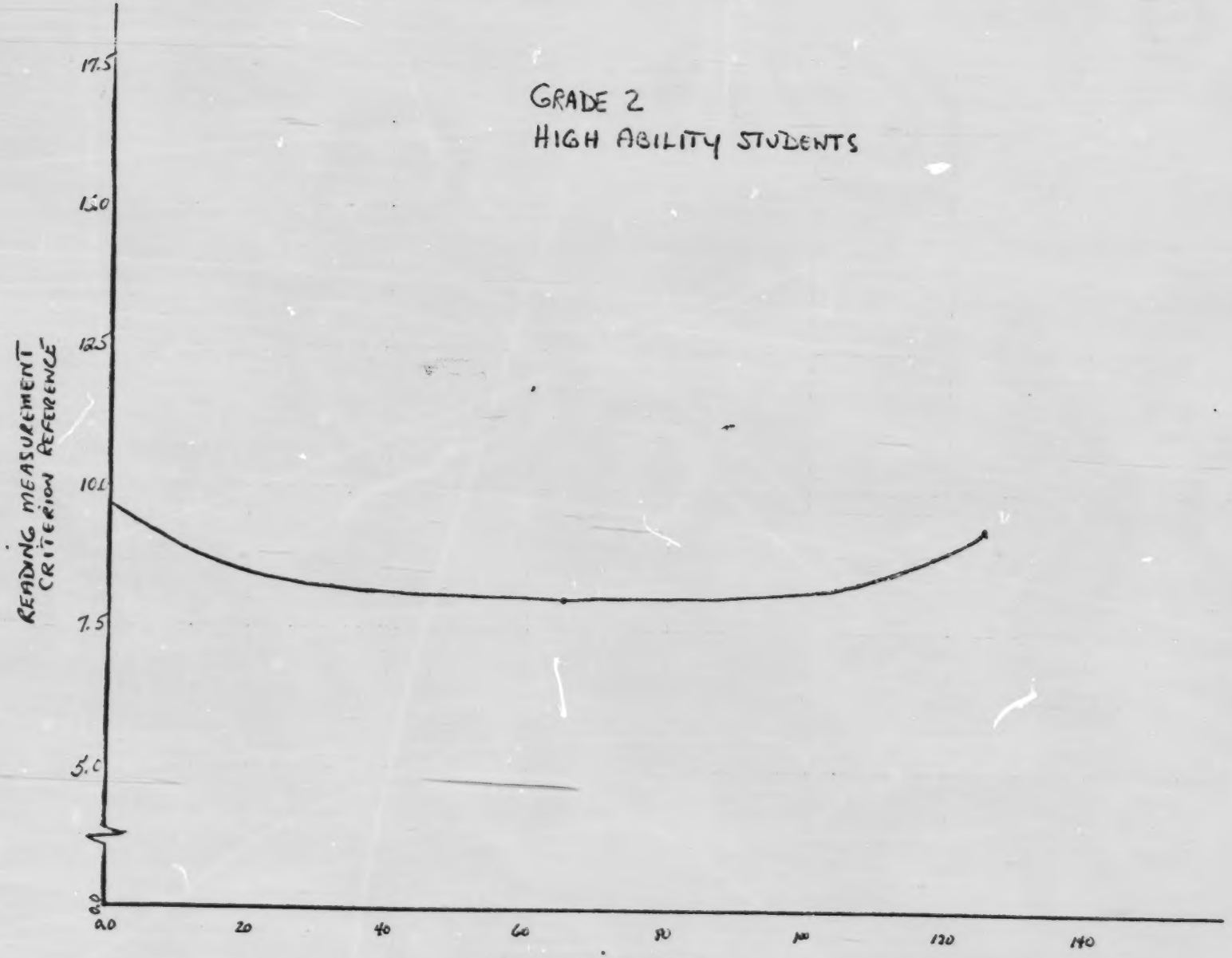


FIGURE 5

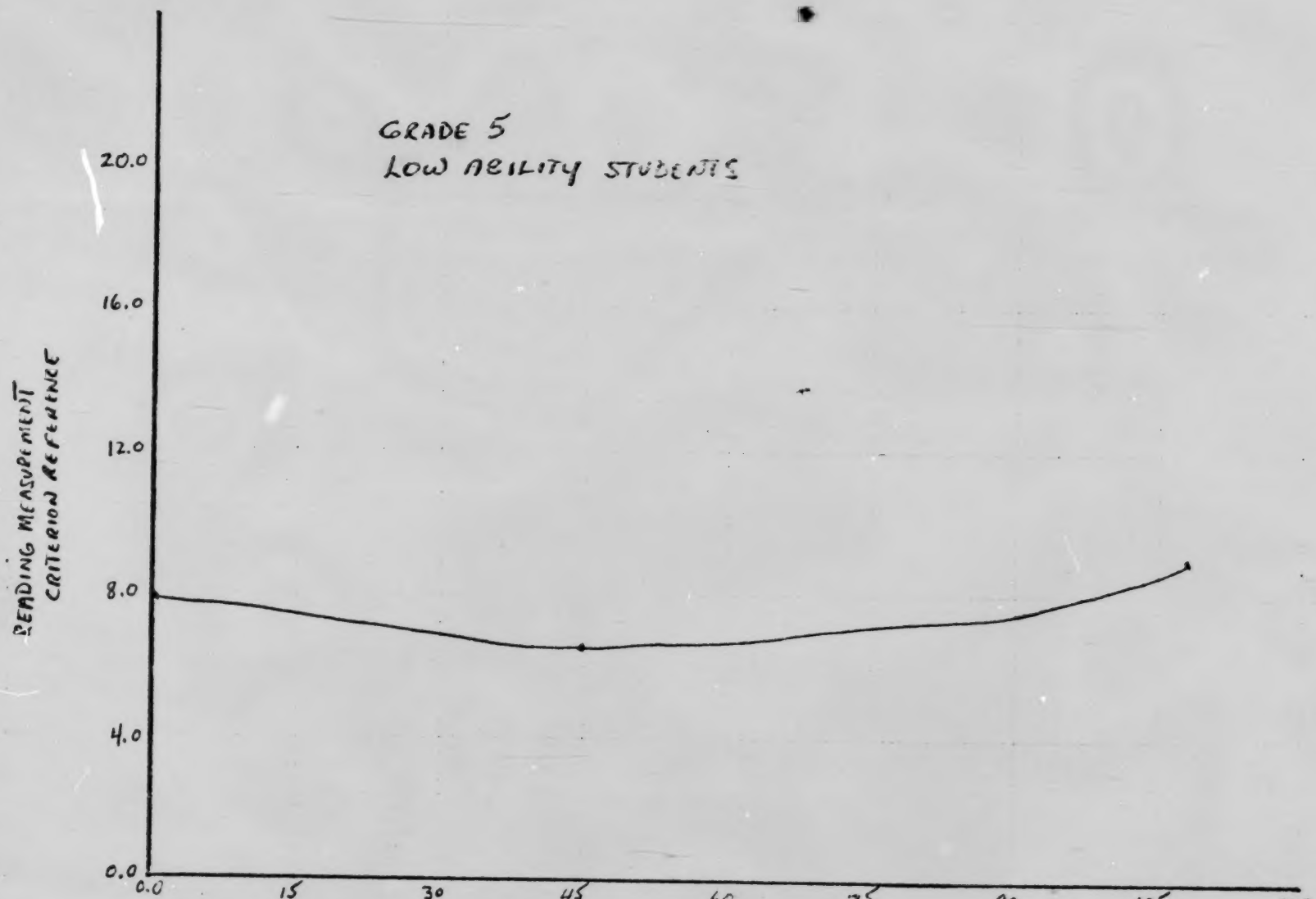

GRADE 5
LOW ABILITY STUDENTS
READING MEASUREMENT
CRITERION REFERENCE
20.0
16.0
12.0
8.0
4.0
0.0
0.0
15
30
45
60
75
90
105
120
INSTRUCTIONAL TIME
WHOLE CLASS DIRECT INSTRUCTION FROM TEACHER
(AVERAGE MINUTES PER WEEK)

FIGURE 6

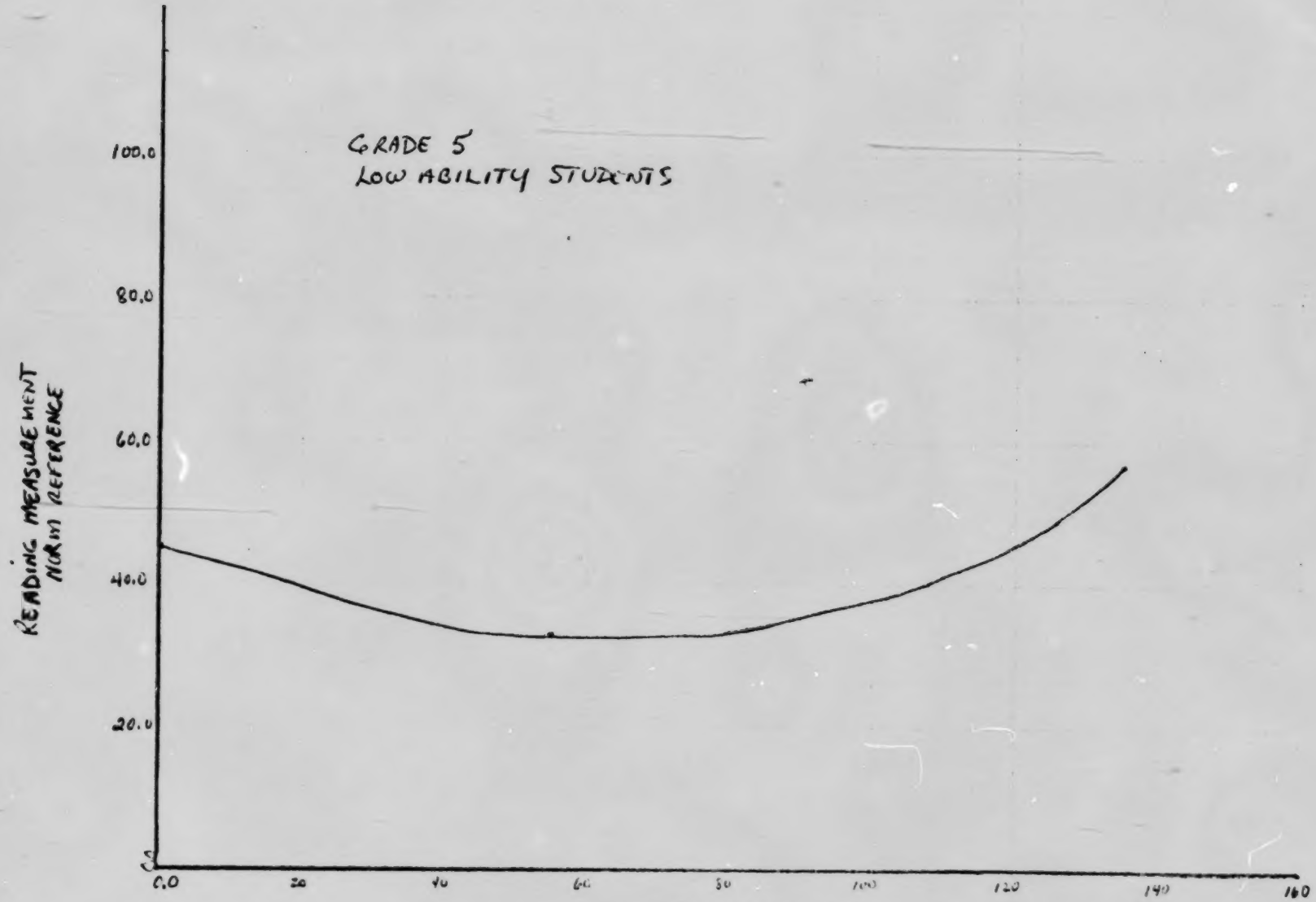

GRADE 5
LOW ABILITY STUDENTS
READING MEASUREMENT
NORM REFERENCE
100.0
80.0
60.0
40.0
20.0
0.0
20
40
60
80
100
120
140
160
INSTRUCTIONAL TIME
SMALL GROUP: DIRECT INSTRUCTION FROM OTHER
(AVERAGE MINUTES PER WEEK)

FIGURE 7

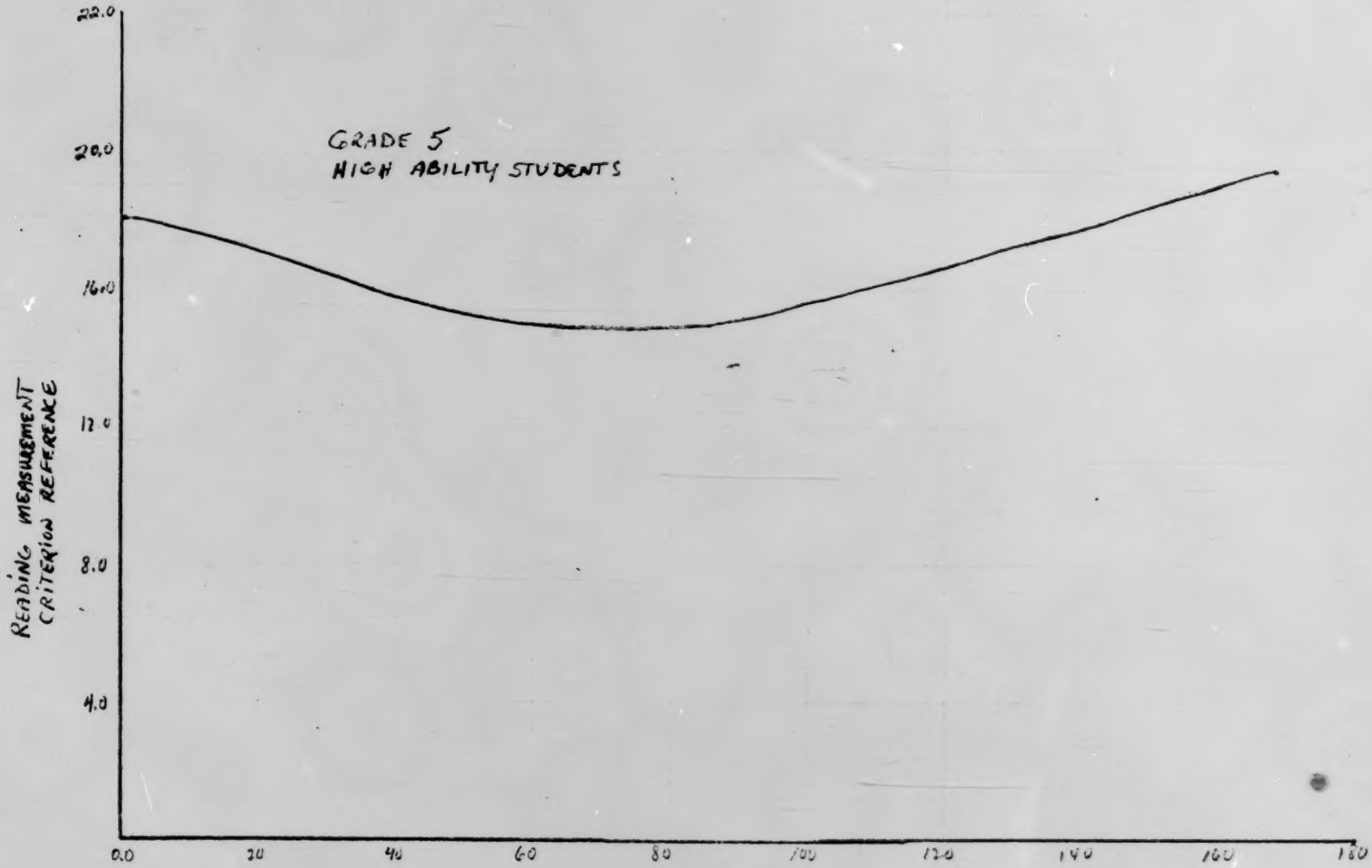

22.0
20.0
16.0
12.0
8.0
4.0
GRADE 5
HIGH ABILITY STUDENTS
READING MEASUREMENT
CRITERION REFERENCE
0.0
20
40
60
80
100
120
140
160
180
INSTRUCTIONAL TIME
SMALL GROUP DIRECT INSTRUCTION FROM TEACHER
(AVERAGE MINUTES PER WEEK)

Table 3

Means and Standard Deviations of Variables
by Grade and Ability

Variable	Grade 2		Grade 5	
	Low Ability (N=205)	High Ability (N=245)	Low Ability (N=141)	High Ability (N=131)
1-1[a]	8.88 (27.23)	0.37 (2.15)	4.50 (15.96)	2.25 (6.14)
SIS	49.44 (67.63)	6.57 (22.25)	45.40 (51.20)	4.85 (13.31)
SIA	36.34 (66.65)	1.47 (8.35)	34.06 (59.10)	- -
WCD	90.56 (76.96)	85.20 (78.04)	25.22 (33.94)	40.75 (46.04)
WCI	27.07 (40.23)	23.65 (37.49)	20.58 (34.79)	46.50 (47.37)
WCG	1.32 (7.16)	0.73 (5.21)	4.91 (13.08)	2.11 (4.58)
SGD	156.68 (68.76)	150.53 (51.29)	93.13 (99.52)	63.95 (50.65)
SGO	15.05 (44.64)	3.96 (17.48)	14.91 (65.67)	9.56 (33.20)
SGI	150.63 (107.08)	170.94 (116.23)	106.05 (66.19)	95.18 (75.95)
SGG	38.17 (59.39)	45.73 (68.64)	17.18 (32.01)	18.11 (35.65)
PRECRT[b]	1.55 (0.79)	6.50 (3.42)	6.58 (3.70)	14.83 (4.19)
POSCRT[b]	2.83 (1.64)	9.22 (3.49)	7.51 (3.89)	16.51 (4.47)
POSNRT[c]	- -	- -	42.40 (15.30)	74.46 (17.59)

[a] Time variables reported in average minutes per typical week of instruction.

[b] Pre and post Multiple-Choice Cloze criterion-referenced reading tests.

[c] Norm-referenced reading test.

Table 4

Zero-Order Correlations Among Linear Predictor Variables for Grade 2 Low Ability Group (N=205)

	1-1[a]	SIS	SIA	WCD	WCI	WCG	SGD	SGO	SGI	SGG	PRECRT[b]	POSCRT[b]
1-1[a]												
SIS	.34											
SIA	-.11	-.16										
WCD	-.02	.12	.07									
WCI	-.06	-.02	.16	.45								
WCG	-.06	-.14	-.01	-.02	.03							
SGD	-.41	-.25	.15	-.05	.02	.11						
SGO	-.11	-.09	.04	-.08	.34	-.06	-.26					
SGI	-.22	-.15	.26	-.04	.06	-.14	.32	.02				
SGG	-.10	-.07	.06	.25	.28	.18	.47	-.16	.14			
PRECRT[b]	-.15	-.21	.07	.08	.19	-.10	.10	.08	.20	.14		
POSCRT[b]	-.18	-.20	-.03	-.07	-.02	-.11	.13	.06	.02	.05	.29	

[a]Time variables reported in average minutes per typical week of instruction.

[b]Pre and post Multiple-Choice Cloze criterion-referenced reading tests.

Table 5

Zero-Order Correlations Among Linear Predictor Variables for Grade 2 High Ability Group (N=245)

1-1[a]												
SIS	-.05											
SIA	-.03	-.05										
WCD	-.15	-.02	.26									
WCI	-.11	.07	.13	.27								
WCG	-.02	-.04	-.02	.00	.10							
SGD	.09	-.18	.00	-.06	.12	.03						
SGO	-.04	-.04	-.04	-.14	-.14	-.03	-.06					
SGI	-.14	.08	-.08	.03	.07	-.06	.45	-.08				
SGG	.01	.05	-.12	-.13	.04	-.01	.39	.01	.14			
PRECRT[b]	-.11	.12	-.06	.04	-.11	-.05	.06	.04	.14	-.01		
POSCRT[b]	-.07	.05	.00	.05	-.14	.00	.07	.09	.04	.07	.52	
	1-1[a]	SIS	SIA	WCD	WCI	WCG	SGD	SGO	SGI	SGG	PRECRT[b]	POSCRT[b]

[a] Time variables reported in average minutes per typical week of instruction.

[b] Pre and post Multiple-Choice Cloze criterion-referenced reading tests.

Table 6

Zero-Order Correlations Among Linear Predictor Variables
for Grade 5 Low Ability Group (N=141)

1-1[a]													
SIS	-.06												
SIA	-.08	-.28											
WCD	-.13	.12	.09										
WCI	-.10	-.13	.19	.52									
WCG	-.11	-.08	.39	.54	.48								
SGD	-.09	-.06	-.16	-.46	-.23	-.35							
SGO	.17	-.02	.10	-.14	-.08	-.09	-.05						
SGI	.14	.06	-.17	-.45	-.53	-.60	-.07	.00					
SGG	.06	-.09	-.12	-.04	-.25	-.20	.39	-.07	.29				
PRECRT[b]	-.12	-.13	-.08	-.12	-.02	-.07	-.12	-.09	.25	-.04			
POSCRT[b]	-.13	-.25	-.15	-.03	.12	-.01	-.07	-.05	.04	.01	.72		
POSNRT[c]	-.21	.06	-.33	-.04	-.08	-.17	-.13	-.09	.20	-.17	.52		
	1-1[a]	SIS	SIA	WCD	WCI	WCG	SGD	SGO	SGI	SGG	PRECRT[b]	POSCRT[b]	POSNRT[c]

[a]Time variables reported in average minutes per typical week of instruction.

[b]Pre and post Multiple-Choice Cloze criterion-referenced reading tests.

[c]Posttest on norm-referenced reading test.

Table 7

Zero-Order Correlations Among Linear Predictor Variables
for Grade 5 High Ability Group (N=131)

	1-1[a]	SIS	WCD	WCI	WCG	SGD	SGO	SGI	SGG	PRECRT[b]	POSCRT[b]	POSNRT[c]
1-1[a]												
SIS	-.13											
WCD	-.04	.10										
WCI	-.23	-.03	-.40									
WCG	-.17	-.17	-.25	.30								
SGD	-.22	-.16	-.39	.10	.19							
SGO	.02	-.04	-.22	-.28	-.13	.05						
SGI	.47	-.19	-.49	-.57	-.07	-.08	.04					
SGG	.53	-.09	-.14	-.43	-.24	-.45	-.01	.70				
PRECRT[b]	-.05	-.11	.12	.26	.13	-.20	-.24	-.02	.03			
POSCRT[b]	-.03	.01	.08	.22	.19	-.12	-.20	-.09	-.05	.63		
POSNRT[c]	-.09	.04	.16	.12	.06	-.14	-.11	-.08	.01	.57		

[a]Time variables reported in average minutes per typical week of instruction.

[b]Pre and post Multiple-Choice Cloze criterion-referenced reading tests.

[c]Posttest on norm-referenced reading test.

Table 8

REGRESSION RESULTS FOR TIME VARIABLE SUBSET MODELS
GRADE 2 STUDENTS BY ABILITY
(MULTIPLE-CHOICE CLOZE CRITERION-REFERENCED MEASURE)

		Low Ability (N=205)		High Ability (N=245)	
	Variable[1]	Standardized Regression Coefficient	Significance Level[2]	Standardized Regression Coefficient	Significance Level[2]
	PRECRT	.267	.000	.493	.000
	$(1\text{-}1)_1$	-	-	-.025	.648
	$(1\text{-}1)_2$	-	-	.168	.002
	$(SIS)_1$	-	-	-	-
	$(SIS)_2$	-	-	-	-
	$(SIA)_1$	-	-	-	-
	$(SIA)_2$	-	-	-	-
WHOLE CLASS	$(WCD)_1$	-.051	.441	-	-
	$(WCD)_2$	-.209	.004	-	-
	$(WCI)_1$	-	-	-.085	.122
	$(WCI)_2$	-	-	.164	.002
	$(WCG)_1$	-.170	.014	-	-
	$(WCG)_2$	-	-	-	-
SMALL GROUP	$(SGD)_1$	.276	.001	.029	.586
	$(SGD)_2$	-.174	.012	.136	.014
	$(SGO)_1$	.147	.043	-	-
	$(SGO)_2$	-	-	-	-
	$(SGI)_1$	-	-	-	-
	$(SGI)_2$	-	-	-	-
	$(SGG)_1$	-.135	.059	-	-
	$(SGG)_2$	-	-	-	-

	F-Ratio	R^2	S.E.EST.	F-Ratio	R^2	S.E.EST.
PRECRT	$p<.01$[3]	.083	-	$p<.001$[3]	.274	-
Subset Model	5.44	.182	1.510	17.63	.342	2.870
Full Model	2.22	.203	1.543	6.19	.368	2.900

[1] Effects of Production Factors: $(\cdot)_1$--linear effect; $(\cdot)_2$--quadratic effect.

[2] p-level: two-tailed Student's t distribution.

[3] Significance level as to whether the subset model instructional time variables together significantly improve the prediction of student performance in reading over that obtained by regressing the dependent measure on the pretest variable.

Table 9

REGRESSION RESULTS FOR TIME VARIABLE SUBSET MODELS
GRADE 5 STUDENTS BY ABILITY
(MULTIPLE-CHOICE CLOZE CRITERION-REFERENCED MEASURE)

		Low Ability (N=141)		High Ability (N=131)	
	Variable[1]	Standardized Regression Coefficient	Significance Level[2]	Standardized Regression Coefficient	Significance Level[2]
	PRECRT	.668	.000	.504	.000
	$(1\text{-}1)_1$	-	-	-	-
	$(1\text{-}1)_2$	-	-	-	-
	$(SIS)_1$	-.172	.004	-	-
	$(SIS)_2$	-	-	-	-
	$(SIA)_1$	-.154	.014	-	-
	$(SIA)_2$	-	-	-	-
WHOLE CLASS	$(WCD)_1$	.049	.466	-.368	.006
	$(WCD)_2$	.110	.050	-	-
	$(WCI)_1$	-	-	-.056	.575
	$(WCI)_2$	-	-	-.143	.099
	$(WCG)_1$	.074	.304	-	-
	$(WCG)_2$	-.181	.001	-	-
SMALL GROUP	$(SGD)_1$	-	-	-.135	.123
	$(SGD)_2$	-	-	.223	.022
	$(SGO)_1$	-	-	-.065	.391
	$(SGO)_2$	-	-	.193	.014
	$(SGI)_1$	-	-	-	-
	$(SGI)_2$	-	-	-	-
	$(SGG)_1$	-	-	-.326	.005
	$(SGG)_2$	-	-	-	-

	F-Ratio	R^2	S.E.EST.	F-Ratio	R^2	S.E.EST.
PRECRT	$p<.001$[3]	.524	-	$\approx p<.05$[3]	.393	-
Subset Model	30.46	.616	2.452	11.40	.459	3.407
Full Model	11.00	.660	2.458	6.19	.482	3.449

[1] Effects of Production Factors: $(\cdot)_1$--linear effect; $(\cdot)_2$--quadratic effect.

[2] p-level: two-tailed Student's t distribution.

[3] Significance level as to whether the subset model instructional time variables together significantly improve the prediction of student performance in reading over that obtained by regressing the dependent measure on the pretest variable.

Table 10

REGRESSION RESULTS FOR TIME VARIABLE SUBSET MODELS
GRADE 5 STUDENTS BY ABILITY
(NORM-REFERENCED MEASURE)

		Low Ability (N=141)		High Ability (N=131)	
	Variable[1]	Standardized Regression Coefficient	Significance Level[2]	Standardized Regression Coefficient	Significance Level[2]
	PRECRT	.322	.000	.549	.000
	$(1\text{-}1)_1$	-	-	-	-
	$(1\text{-}1)_2$	-	-	-	-
	$(SIS)_1$	-	-	-	-
	$(SIS)_2$	-	-	-	-
	$(SIA)_1$	-.314	.000	-	-
	$(SIA)_2$	-	-	-	-
WHOLE CLASS	$(WCD)_1$	-	-	-	-
	$(WCD)_2$	-	-	-	-
	$(WCI)_1$	-	-	-.185	.054
	$(WCI)_2$	-	-	-	-
	$(WCG)_1$	-	-	-	-
	$(WCG)_2$	-	-	-	-
SMALL GROUP	$(SGD)_1$	-.260	.006	-.031	.670
	$(SGD)_2$	-	-	.203	.011
	$(SGO)_1$	-.074	.250	-	-
	$(SGO)_2$	.230	.001	-	-
	$(SGI)_1$	-.062	.439	-.189	.036
	$(SGI)_2$	-.394	.000	-	-
	$(SGG)_1$	.026	.787	-	-
	$(SGG)_2$	.247	.006	-	-

	F-Ratio	R^2	S.E.EST.	F-Ratio	R^2	S.E.EST.
PRECRT	$p<.001$[3]	.269	-	$\approx p<.05$[3]	.327	-
Subset Model	13.86	.488	11.318	15.00	.375	14.184
Full Model	6.24	.524	11.445	4.91	.425	14.311

[1] Effects of Production Factors: $(\cdot)_1$--linear effect; $(\cdot)_2$--quadratic effect.

[2] p-level: two-tailed Student's t distribution.

[3] Significance level as to whether the subset model instructional time variables together significantly improve the prediction of student performance in reading over that obtained by regressing the dependent measure on the pretest variable.

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Appendix A

Difficulty Levels Based on Readability Scores

Readability formula	Readability score	Difficulty level
Spache	1.0-1.4	1
	1.5-1.9	2
	2.0-2.4	3
	2.5-2.9	4
	3.0-3.4	5
	3.5-3.9	6
Dale-Chall	4.50-4.74	7
	4.75-4.99	8
	5.00-5.24	9
	5.25-5.49	10
	5.50-5.74	11
	5.75-5.99	12
	6.00-6.24	13
	6.25-6.49	14
	6.50-6.74	15
	6.75-6.99	16
	7.00-7.24	17
	7.25-7.49	18
	7.50-7.74	19
	7.75-7.99	20
	8.00-8.24	21
	8.25-8.49	22
	8.50-8.74	23
	8.75-8.99	24
	9.00-9.24	25
	9.25-9.49	26
	9.50-9.74	27
	9.75-9.99	28

Appendix B

Passage Difficulty Levels for MCC Achievement Monitors

Monitor Level 1				
Passage	Form 11	Form 12	Form 13	Form 14
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	6	5	6
6	7	8	7	8

Monitor Level 2				
Passage	Form 21	Form 22	Form 23	Form 24
1	5	4	5	4
2	7	6	7	6
3	9	8	9	8
4	11	10	11	10
5	13	12	13	12

Monitor Level 3				
Passage	Form 31	Form 32	Form 33	Form 34
1	7	8	7	8
2	9	10	9	10
3	11	12	11	12
4	13	14	13	14
5	15	16	15	16

Monitor Level 4				
Passage	Form 41	Form 42	Form 43	Form 44
1	11	10	11	10
2	13	12	13	12
3	15	14	15	14
4	17	16	17	16
5	19	18	19	18

Monitor Level 5				
Passage	Form 51	Form 52	Form 53	Form 54
1	13	14	13	14
2	15	16	15	16
3	17	18	17	18
4	19	20	19	20
5	21	22	21	22

Monitor Level 6				
Passage	Form 61	Form 62	Form 63	Form 64
1	17	18	17	18
2	19	20	19	20
3	21	22	21	22
4	23	24	23	24
5	25	26	25	26

22
Form

Name

Appendix C

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Division of Research
Albany, New York 12234
1977

PRACTICE

Ben comes to see the birds. The ____1____ fly up. The birds fly down. They ____2____ to Ben. Ben says, "Fly, birds." The ____3____ fly up. They fly up high. They fly away.

(1)
1. paints
2. birds
3. pigs

(2)
1. read
2. come
3. truck

(3)
1. men
2. cakes
3. birds

Bernie has an island. He _____1_____ it by himself. When he is on his _____2_____, nobody can see him. He _____3_____ there when he wants to hide from _____4_____ . Not because he is mad at anyone. But because sometimes he just _____5_____ to sit alone and think.

(1)
1. dressed
2. followed
3. shut
4. made

(2)
1. ball
2. rocket
3. island
4. dollar

(3)
1. builds
2. picks
3. goes
4. traps

(4)
1. people
2. corners
3. feet
4. libraries

(5)
1. calls
2. likes
3. waters
4. bounces

The old man raised his ___6___ and stood listening. He had ___7___ Pa's queer, thick ___8___ from behind the wagon. He started to ___9___ toward it. Nummer ___10___ to Ma in a ___11___ of Indian words as if he were ___12___ to explain something important.

Tad ___13___ in excitedly, "I'll bet he is ___14___ that the old man can ___15___ . Let's let him try."

(6)
1. howl
2. puppy
3. head
4. lid
5. giraffe

(7)
1. clawed
2. moved
3. decked
4. heard
5. stuffed

(8)
1. voice
2. ground
3. route
4. magic
5. smell

(9)
1. flicker
2. heave
3. breeze
4. walk
5. deal

(10)
1. shot
2. darted
3. stole
4. streaked
5. spoke

(11)
1. jug
2. heaven
3. settlement
4. flood
5. helmet

(12)
1. fetching
2. writing
3. trying
4. sloping
5. scowling

(13)
1. looked
2. broke
3. drove
4. led
5. waddled

(14)
1. blowing
2. giggling
3. grasping
4. saying
5. wobbling

(15)
1. swallow
2. flare
3. note
4. help
5. enchant

Harriet Tubman was born in Maryland in the ___16___ 1820's. She was born a ___17___, the daughter and granddaughter of ___18___ . Her great-grandmother had been ___19___ by a ship's captain and ___20___ from Africa to Baltimore in the 1700's.

During Harriet's ___21___ she lived and worked with her ___22___ and father on a Maryland ___23___ . She learned to hoe broad-leaved ___24___, and chop the weeds around the ___25___ .

(16)
1. sandy
2. fast
3. tidy
4. sturdy
5. early

(17)
1. compass
2. wedge
3. bar
4. hut
5. slave

(18)
1. slaves
2. antlers
3. upsets
4. telephones
5. frames

(19)
1. kidnapped
2. coached
3. strained
4. fluffed
5. furnished

(20)
1. kicked
2. extended
3. squeezed
4. brought
5. cooked

(21)
1. youth
2. sunlight
3. fright
4. fever
5. beauty

(22)
1. mother
2. cloak
3. detective
4. chorus
5. clop

(23)
1. skirt
2. carriage
3. commander
4. floor
5. plantation

(24)
1. string
2. tobacco
3. wire
4. grease
5. pudding

(25)
1. corn
2. wind
3. lad
4. map
5. heel

When we had agreed to ___26___ for treasure we all ___27___ down into the ___28___ and turned on the ___29___ . Oswald would have liked to ___30___ there, but it is ___31___ . We looked among the ___32___ boxes and broken chairs and ___33___ and empty bottles and ___34___, and at last we ___35___ the spades we had used to dig in the sand when we went to the seashore three years ago.

(26)
1. shoe
2. dig
3. allow
4. cut
5. protest

(27)
1. went
2. bit
3. sniffed
4. pressed
5. scrubbed

(28)
1. zigzag
2. ticket
3. cellar
4. code
5. pin

(29)
1. light
2. column
3. throat
4. mast
5. stick

(30)
1. dig
2. desert
3. thumb
4. shake
5. buy

(31)
1. youth
2. faith
3. vinegar
4. flagstone
5. beginning

(32)
1. feathery
2. underwater
3. ill
4. practical
5. old

(33)
1. bulldogs
2. concerts
3. fenders
4. sighs
5. errands

(34)
1. clowns
2. orioles
3. things
4. butchers
5. faces

(35)
1. scheduled
2. protected
3. found
4. dismayed
5. sewed

A great grief came to Orpheus, a grief that ___36___ his singing and his ___37___ upon the lyre. His ___38___ wife, Eurydike, was ___39___ from him. One day, ___40___ in the garden, she was ___41___ on the heel by a ___42___; straightway she went ___43___ to the World of the Dead.

Then everything in this ___44___ was dark and bitter for the ___45___ of the gods.

(36)
1. fed
2. predicted
3. dreamed
4. devoured
5. stopped

(37)
1. scampering
2. bending
3. colliding
4. bursting
5. playing

(38)
1. transparent
2. frequent
3. young
4. solid
5. wooden

(39)
1. taken
2. adapted
3. copied
4. borrowed
5. risen

(40)
1. raining
2. purring
3. walking
4. roasting
5. filming

(41)
1. reflected
2. met
3. flagged
4. gathered
5. bitten

(42)
1. pasture
2. serpent
3. wedge
4. calico
5. cottonwood

(43)
1. snugly
2. èqually
3. down
4. less
5. continually

(44)
1. spectator
2. movie
3. world
4. tidbit
5. peer

(45)
1. break
2. corral
3. airport
4. minstrel
5. crater

Appendix D

NEW YORK STATE EDUCATION DEPARTMENT
Bureau of School and Cultural Research
Albany, NY 12234

District _____

School _____

Teacher _____

Grade _____ Date _____

PAR PROJECT--PROGRAM ANALYSIS IN READING

Teacher Questionnaire*

This questionnaire solicits information on your classroom reading program. For purposes of this project, the following are considered reading activities/ skills:

- Word recognition skills--phonics, structural analysis, context, sight words.
- Oral reading.
- Vocabulary--meanings of words, prefixes, suffixes, roots, synonyms, antonyms.
- Comprehension/Critical reading--literal, inferential, critical reading (such as knowledge of literary devices), silent reading.
- Study skills--library skills, reference skills, following directions, organizing.
- Readiness skills--alphabet recognition, visual discrimination, auditory discrimination, listening comprehension, perception, attending, language development activities, verbal interaction.
- Free Reading/Library Period--a time set aside during a reading period when pupils choose their own books to read. Book reports may or may not be required. Library Period can be conducted within the class or at the school library.
- Listening to stories for a purpose--any listening activity in which the pupil follows along in a book and/or has to demonstrate comprehension.

Note that for purposes of this project such activities and skills as handwriting, spelling, English usage and mechanics, and creative writing are not considered part of a reading program.

*Portions of this questionnaire were adapted with permission from materials developed by Kirschner Associates, Inc. for the National Institute of Education.

1. Classroom Reading Program Description

Describe your classroom reading program, including such aspects as organization for instruction, pupil records, materials, basic approach, etc.

2. Grouping: Pupil Assignments

List, in alphabetical order, all pupils to whom you teach reading. In the column(s) at the right, check the group or groups in which each pupil receives instruction. If a pupil receives some reading instruction with all other pupils in the class and some in a small group, check both "Whole Class" and the appropriate small group.

Pupil	Whole Class	Small Group			
		1	2	3	4
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					
31.					
32.					
33.					

3. Grouping: Basis

Indicate the special characteristics of, or basis for assignment to, each group checked in item 2.

Whole Class	
Small Group 1	
Small Group 2	
Small Group 3	
Small Group 4	

4. Allocated Time for Reading

Indicate the number of minutes you allocate for reading each day of a typical week. Do not include preparation time.

Day	Minutes
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

5. One-to-One Instruction

In addition to receiving reading instruction with the whole class and/or in a small group, do any of your pupils regularly receive one-to-one instruction in your classroom? (CIRCLE RESPONSE.)

Yes No

If yes, list the pupils who regularly receive one-to-one instruction. Indicate the average number of minutes per week.

Pupil	Average Number of Minutes/Week

6. Supplemental Reading Instruction

List below all of your reading pupils who receive supplemental reading instruction outside your classroom. Indicate for each pupil the title (e.g., Reading Specialist, Paid Aide) of the person or persons giving the instruction and the number of minutes of instruction received each week. Note: Supplemental reading instruction is assumed to increase the total time a pupil spends in reading instruction. If a pupil misses classroom reading instruction of any kind for supplemental instruction, record the minutes of classroom reading time lost per week in the column at the far right.

Pupil	Instructor (title)	Min. per week	Instructor (title)	Min. per week	Class Time Lost
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					

7A. Information for Pupil Placement

What information is available to you at the beginning of the school year for making instructional decisions on individual pupils? (CHECK ALL THAT APPLY.)

___1. Criterion-referenced tests on objectives

___2. Standardized test results

___3. Curriculum-provided tests

___4. Kit-placement tests

___5. Teacher-made tests

___6. Placement of child at end of previous year

___7. Wishes of child/parent

___8. Reading specialist's recommendation

___9. Observation of work sample

___10. Conference with specialist (psychologist, guidance counselor, physician)

___11. Conference with pupil

___12. Other (SPECIFY) _____

_____

7B. Indicate below the groups for which each type of information checked is used in instructional decision-making. (PLACE CHECK IN APPROPRIATE COLUMN(S).)

Information	Whole Class	Small Group			
		1	2	3	4
1. Criterion-referenced tests on objectives					
2. Standardized test results					
3. Curriculum-provided tests					
4. Kit-placement tests					
5. Teacher-made tests					
6. Placement of child at end of previous year					
7. Wishes of child/parent					
8. Reading specialist's recommendation					
9. Observation of work sample					
10. Conference with specialist (psychologist, guidance counselor, physician)					
11. Conference with pupil					
12. Other (SPECIFY) _____ _____					

8. Assessing Pupil Progress

Is there a systematic way of assessing pupil progress or mastery of specific skills built into your classroom reading program? (CIRCLE RESPONSE.)

Yes No

If yes, do you usually use it? (CIRCLE RESPONSE.)

Yes No

9A. Methods of Assessment

What methods do you use to assess pupil mastery of specific skills in reading? (CHECK ALL THAT APPLY.)

___1. Criterion-referenced tests on objectives

___2. Standardized test results

___3. Curriculum-provided tests

___4. Kit-placement tests

___5. Teacher-made tests

___6. Review of in-class assignments

___7. Review of homework

___8. Completion of work units

___9. Observation of work sample

___10. Conference with reading specialist

___11. Conference with pupil

___12. Other (SPECIFY) _____

_____

9B. Rank the methods checked above in terms of their relative importance in your assessment of mastery. (Rank 1 would be most important, rank 2 would be next in importance, etc.)

_____ Criterion-referenced tests on objectives

_____ Standardized test results

_____ Curriculum-provided tests

_____ Kit-placement tests

_____ Teacher-made tests

_____ Review of in-class assignments

_____ Review of homework

_____ Completion of work units

_____ Observation of work sample

_____ Conference with reading specialist

_____ Conference with pupil

_____ Other (SPECIFY) _____

_____

10. Instruction in Literal Comprehension

Have you instructed all of your pupils in literal comprehension skills? Literal comprehension instruction includes, for example, asking and following up on questions about the details and the sequence of events in reading materials, or discussing word meanings in context. (CIRCLE RESPONSE.)

Yes No

If no, list the pupils or check the group(s) indicated in item 2 that will not receive instruction in literal comprehension this year.

Pupil	Group
_____	Whole Class _____
_____	Small Group 1 _____
_____	Small Group 2 _____
_____	Small Group 3 _____
_____	Small Group 4 _____

11. Instructional Materials

Typically, what kinds of instructional materials do you use in your classroom reading program? (CHECK ALL THAT APPLY.)

___1. Basic text
___2. Supplemental text
___3. Library books
___4. Audiotapes
___5. Workbooks or worksheets
___6. Instructional kits
___7. Computer/CAI
___8. Film strips
___9. Films
___10. Games
___11. Language masters
___12. Flash cards or work cards
___13. Other (SPECIFY) _____

_____

12. Years in This School

How many years have you taught in this school, not including this year? Please distinguish between "full" years (i.e., taught full-time from the opening to the close of the school year) and "partial" years (e.g., started after school had opened, left before school closed, taught irregularly as a substitute). (RECORD NUMBER OF YEARS FOR EACH.)

Full Years: _____ Partial Years: _____

13. Instructional Time and Setting in the Classroom

This item consists of a set of forms for recording, for each of your reading groups, (1) the amount of time spent on reading instruction in a typical school week and (2) the type of setting in which the instruction takes place, e.g., with the pupils receiving instruction from the classroom teacher, working in a group without the classroom teacher or other instructor, or working individually. A completed Sample Form illustrates how the forms are to be used. Study the Sample Form and then follow the steps outlined below.

Sample Form

Miss Green has completed this form for her third small reading group. It shows that group 3 has reading instruction every day from 9:30 to 10:30 and from 1:30 to 2:30. Half of the morning period is regulary devoted to instruction from the teacher (T-30 minutes); the remaining time is used for individual, independent activities (P) and/or for independent group work (G). In the afternoon, the time allocation is the same every day; the pupils spend 30 minutes with the teacher (T) and 30 minutes working individually and independently (P). On Tuesdays and Thursdays, group 3 has a third reading period (12:20-1:00), all of which is spent with a teacher aide (T*) in the classroom.

Steps for Completion of Forms

Fill out a separate form for each of the reading groups identified in item 2. Keep in mind that one person cannot give direct instruction to two or more groups at the same time.

1. Heading. At the top of the form enter your name and identify the group. (Whole Class, Small Group 1, Small Group 2, etc.)

2. Time Period. At the top of the chart, record the starting and finishing time of every portion of any day or days of the week usually spent on reading instruction. Draw vertical lines to separate the time periods.

3. Setting. In the boxes under the time periods, show, for each day on which instruction occurs, the type of instructional setting. Use the following codes:

   T --Pupils are receiving direct instruction from the classroom teacher.

   T*--Pupils are receiving direct instruction from someone other than the classroom teacher. (Give the title of the person(s) in a note beneath the chart.)

   P --Each pupil is working by himself, independently.

   G --Pupils are working together in a group or groups without the teacher or any other instructor.

In every time block record the number of minutes usually spent in each type of instructional setting.

INSTRUCTIONAL TIME AND SETTING IN THE CLASSROOM

Teacher: Miss Green

Group: #3

SAMPLE FORM

Day	Time Period			
	9:30-10:30	12:20-1:00	1:30-2:30	
Monday	T - 30 min. P - 10 min. G - 20 min.		T - 30 min. P - 30 min.	
Tuesday	T - 30 min. P - 10 min. G - 20 min.	T* - 40 min.	T - 30 min. P - 30 min.	
Wednesday	T - 30 min. P - 10 min. G - 20 min.		T - 30 min. P - 30 min.	
Thursday	T - 30 min. P - 10 min G - 20 min	T* - 40 min.	T - 30 min P - 30 min.	
Friday	T - 30 min. G - 30 min.		T - 30 min P - 30 min.	

Code: T = Direct instruction from classroom teacher

T* = Direct instruction from person other than classroom teacher

P = Each pupil working independently

G = Pupils working in a group or groups without teacher or other instructor

Notes: T* - teacher aide in the classroom

INSTRUCTIONAL TIME AND SETTING IN THE CLASSROOM

Teacher: _____ Group: _____

Day	Time Period
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Code: T = Direct instruction from classroom teacher

T* = Direct instruction from person other than classroom teacher

P = Each pupil working independently

G = Pupils working in a group or groups without teacher or other instructor

Notes: _____

_____

_____

_____